

## Nesting Status of the Brown Pelican in Florida in 1968

LOVETT E. WILLIAMS, JR., AND LARRY MARTIN

It is now well known that the brown pelican (*Pelecanus occidentalis*) recently disappeared as a nesting species from Louisiana. Van Tets (1965, p. 11) probably made one of the last observations of an active nesting colony in Louisiana on May 21, 1961, when he visited North Island and saw 200 pairs of nesting adults and 100 nestlings. Whether breeding was ultimately successful on North Island in 1961 is not known, but when one of us visited the same colony site in May, June, and July of 1962, no more than six pelicans were seen. They were not nesting. There has been no evidence of pelicans nesting in Louisiana since 1961. Oberholser (1938) counted 2,300 nests in the colony on North Island in 1933.

The species was disappearing from Texas at the same time. Only 4 nests could be found there in 1967 and only two pairs nested there in 1968 (Henry Hildebrand, pers. comm.). It was an abundant bird on the Texas coast as recently as 1961.

The former status of the species in Mexico is not clear, but it was known to have been abundant along the Gulf coast at one time (Friedmann, Griscom, and Moore, 1950). Aerial surveys in February 1966 (A. R. Brazda, pers. comm.), and January 1967 (R. H. Chabreck, pers. comm.) revealed no pelicans on the Gulf coast of Mexico, north of Tampico.

The species has not nested in recent times in Alabama (Imhof, 1962), Mississippi (Burleigh, 1944), or western Florida (Howell, 1932). Thus, the peninsula of Florida is the only place in the northern Gulf of Mexico where the brown pelican now nests.

There are supposedly some large colonies on the Pacific coast, but we have recently been informed that some of these have disappeared (Ralph W. Schreiber, pers. comm.) and that the species is becoming scarce north of San Diego, California. Ben Glading (pers. comm.) believes that it has been declining gradually in California for several years.

There are nesting colonies in South Carolina (Sprunt and Chamberlain, 1949), but some observers (T. A. Beckett, III, pers. comm.) think that the population is decreasing there. It does not nest on the Georgia coast (Burleigh, 1958, p. 89).

The brown pelican may be still abundant in other parts of its

range, which is said to include the Pacific coast of North and South America from Canada to southern Chile, and the Atlantic coasts from North Carolina, through the West Indies, to northern Brazil (AOU Checklist, 1957), but current population numbers are very imperfectly known.

Now that the species is gone from a large part of the coastline of the Gulf of Mexico, attempts are being made to determine its original abundance and distribution there, and to learn what happened to it and why. But it is probably too late to determine any of these things accurately, and it is certainly too late to learn much about its natural role and biological nature in the range from which it has disappeared.

Whatever the causes may have been, there is no reason to doubt that the species can be extirpated from any other part of its range as quickly as it was from Louisiana, Texas, and eastern Mexico. In the absence of any objective data on its abundance or accurate information on its local distribution, its populations could be greatly reduced, if not its disappearance virtually assured, before a decline would be evident.

It was that thought which led to our study on the species, which was undertaken in 1965 with three main objectives: 1) to census the nesting population in Florida, 2) to learn the nature and causes of mysterious deaths of pelicans, and 3) to learn, if possible, whether disease, parasites, or chemical pollution pose threats to populations of the species. Some data on chemical contamination of body tissues will be reported separately (manuscript in preparation), and some progress is being made on the other objectives. The present paper is a report on the initial population census in Florida.

## METHODS

A small amount of published information on locations and sizes of brown pelican nesting colonies in Florida is available (Longstreet, 1931; Howell, 1932; Mason, 1945). While this information will be valuable in a broader analysis of the history and biology of the species, the immediate discussion of the breeding status in Florida in 1968 does not call for frequent mention of these sources of information.

A preliminary aerial reconnaissance in a four-seat, single-engine

Cessna airplane on March 17, 1966, from the Suwannee River to Key West indicated the feasibility of finding pelican nesting colonies from the air. A similar flight on June 14, 1967, further assured us of the capabilities of this method of census, although a complete inventory was not attempted then.

The preliminary flights revealed that it would be impractical to attempt to census brown pelicans from the air when they were not concentrated in nesting colonies.

The survey flights were confined to the coast because the brown pelican does not occur inland under normal circumstances.

Separate surveys of different parts of the Florida coast were made in 1967 on May 8, June 13, and July 11 to locate nesting colonies and estimate the numbers of nests. Twenty-one active colonies were found and plotted on maps. Only one of these was in the Florida Keys (Monroe County). Evidence that nesting had taken place earlier that season in the Keys was noted on May 8.

A poll of reliable observers and written sources revealed several colonies (mostly very small) which were not seen on any of the three survey flights in 1967. The apparent early nesting in the Keys and the allegedly large number of colonies not seen on the aerial survey caused us to consider the 1967 survey to be incomplete.

The information available from helpful observers and our own aerial observations during 1966 and 1967 suggested considerable seasonal differences from year to year in peak nesting activity in southern Florida. To determine whether more than one flight would be necessary in order to find some stage of nesting underway throughout the state, a one-day flight was made in late February of 1968 to ascertain the progress of nesting in the Keys. Adult pelicans were found congregating at colony sites, but little nesting was underway. The only hatchlings were seen on the Marquesas Keys, west of Key West. They were very young.

Our work in nesting colonies in 1967 had indicated that pelicans cannot fly before they are nine weeks old. With this in mind, it seemed safe to schedule a single flight of the entire coast for early May 1968.

It should be noted that at the time of the survey, peak nesting was probably in progress only near the median latitude of the peninsula, or approximately in the vicinity of Sarasota. This survey, therefore, does not present an estimate of the maximum number of

brown pelicans which nested in Florida in 1968. It is a more conservative estimate.

Before the 1968 survey was made, all sources of information on the probable locations of pelican nesting colonies were explored. These included a search of the literature and a poll of naturalists and laymen in the Florida Audubon Society and anyone else we learned of who might have any knowledge of current or historic colony sites. Altogether, over 50 possible colony sites were tabulated. All of these were checked by airplane.

Howell (1932) gives Cedar Key (Levy County) as the northernmost breeding locality in Florida on the Gulf. The only report that we can find of the brown pelican nesting north of Cedar Key at any time in Florida is a statement by Howell (1932, p. 84) that "The birds formerly bred on St. George Island (1860)." The basis for Howell's statement is not known to us, but we know from past personal field experience that the species has not nested on the Florida Gulf coast north of Cedar Key in recent years. Further, Weston (1965) does not list the species as breeding in northwestern Florida. In view of this, aerial surveys in northwestern Florida did not seem warranted.

On May 6, 1968, the survey began at the mouth of the Suwannee River on the Gulf of Mexico and proceeded southward in a Cessna Skylane airplane at altitudes between 200 and 500 feet.

The coastline was searched systematically to check all reported or suspected colony sites. When congregations of birds of any species were seen, the place was approached closely enough to ascertain without doubt whether pelicans were present, and to distinguish between pelicans on nests and those only resting in trees.

A pilot handled the plane, leaving us both free to observe without distraction. Both of us kept separate lists of the numbers of pelicans counted at each colony in an attempt to obtain an estimate of variation in observer judgment. Although our individual estimates of the numbers of nests in particular colonies usually varied, our close agreement in the total count of all colonies provides a degree of confidence in the overall accuracy of the survey.

In the vicinity of the Ten Thousand Islands, frequent criss-crossing was necessary to inspect all islands. Because of the great number of islands there, it is possible that one or more small



colonies were missed. But all islands in these areas which seemed likely to hold nesting colonies were checked carefully. Systematic searching covered approximately 70 per cent of the islands.

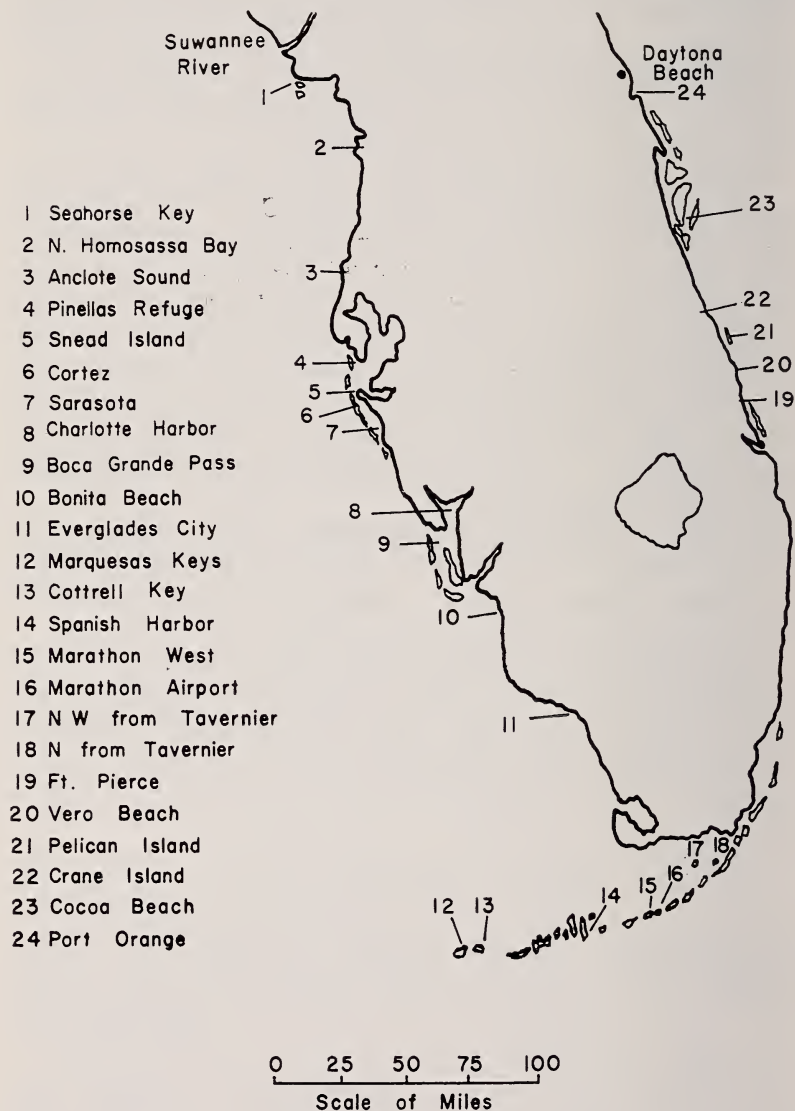


Fig. 1. Active brown pelican colonies in Florida on May 6 and 7, 1968.

The survey continued on May 7 from the Marquesas Keys and proceeded through Florida Bay on a crisscross pattern. The Keys in Florida Bay presented a problem similar to the Ten Thousand Islands. At least 60 per cent coverage was effected. The flight northward along the east coast of Florida proceeded rapidly because of the linear nature of the coast and the few islands between Key Largo and Fort Pierce. The coast north of Port Orange to the Georgia state line on the Atlantic was searched thoroughly because a colony was reported to have been seen there about ten years ago. None was found on the present survey.

The approximate position and a locality name for each active colony found in Florida during early May of 1968 are plotted in Fig. 1. The only colony in the figure which was not seen from the air on May 6 or 7 was on Hall Island near Cocoa Beach where we could not fly because of government restrictions. We were told of the colony by members of the Florida Audubon Society. This area, in the vicinity of the Cape Kennedy Space Center, was searched by boat on May 13. The Hall Island Colony was seen then.

#### RESULTS AND DISCUSSION

The estimated nesting population given in Table 1 is a sum of the highest total count either of us made for each colony. There is no particular reason for using the higher figure except that we believe most aerial observers tend to underestimate dense congregations of birds. The higher estimate is probably more realistic. We plan to refine our methods in future surveys along the lines suggested by Kadlec and Drury (1968) and test the usefulness of aerial photography, but we are not prepared to analyze the accuracy of the present survey further at this time.

Cooperators in the Florida Bay area reported that many pelicans finished nesting before early May 1968 and were consequently not included in the present population estimate (Table 1).

*Colony Site Selection.* All of the colonies we have observed in Florida were on small islands. None has been found on the mainland. The only colony we found which was made up entirely of ground nest sites is also located on two of the smallest islands of any colony in Florida. While we have not analyzed the characteristics of the colony islands carefully yet, there seems to be a positive correlation between height of nest sites and largeness of the island.

TABLE 1

Active brown pelican colonies in Florida in early May 1968

Locality Name	Nests
Seahorse Key	220
N. Homosassa Bay	50
Anclote Sound	105
Pinellas Refuge	800
Snead Island	400
Cortez	550
Sarasota	100
Boca Grande Pass	900
Charlotte Harbor	600
Bonita Beach	90
Everglades City	110
Marquesas Keys	200
Cottrell Key	60
Spanish Harbor	10
Marathon West	110
Marathon Airport	70
NW from Tavernier	50
N from Tavernier	80
Ft. Pierce	120
Vero Beach	80
Pelican Island	600
Crane Island	550
Cocoa Beach	500
Port Orange	350
Total	6,705

*Colony Shifts.* It has long been known that pelicans shift the location of their nesting colonies, but the magnitude and significance of this have not been explored.

Pelican Island on the Atlantic coast has been occupied by brown pelicans as a nesting site off and on at least since 1858 (Mason, 1945), in spite of the fact that virtually all of the trees on the small island have been killed at times, thereby reducing the birds to ground nesting and excessive crowding. The pelicans finally abandoned Pelican Island in 1923 and were presumed (Mason, 1945) to be the same birds which established a new colony at Merritt Island, about 50 miles to the north. Since Mason (1945) wrote on the subject, the species has resumed a thriving colony on Pelican Island but there remains a large colony in the Merritt

Island area (Cocoa Beach) to which they were thought to have deserted in 1923. The history of the Pelican Island colony shows tenacity on the part of the pelican for it as an ancestral colony site and a tendency for it to be reoccupied even many years after being abandoned. On the other hand, colonies in the Gulf seem to shift locations more frequently. Several colonies were found on the Gulf coast in 1966 which were not active in 1967. Some were reoccupied the next year (in 1968), some were not; others were occupied in 1966 and 1967 but not in 1968.

The apparent ease with which pelicans shift colony sites in the Gulf suggests an abundance of suitable nesting islands there as compared to the Atlantic coast. One of the interesting questions this raises is whether the pelican population could be increased on the Atlantic coast by the artificial creation of suitable nesting islands.

*Colony Population.* Our observations on the average sizes and number of colonies in the Gulf versus those in the Atlantic seem to further support the idea of a scarcity of suitable nesting habitat in the Atlantic. The 18 active colonies found in 1968 in the Gulf contained an average of 261 nests; the six colonies in the Atlantic averaged 333 nests, or about 23 per cent more nests per colony in the Atlantic than in the Gulf.

#### RESEARCH NEEDS

Obviously, no conclusions can be drawn from this initial survey about population trends of pelicans in Florida. Annual surveys should be made to provide comparative year-to-year data.

Mysterious mortality is often reported in wild pelicans. Although some specimens have been autopsied for parasites, few, if any, determinations as to the cause of death have been made. In order to discern in its early stages mortality which is destined to result in significant population reduction, it seems essential that natural mortality be recognizable and that the population dynamics of the species be better understood.

The extirpation of the brown pelican from Louisiana apparently took place in a matter of only two or three years, around 1960. The species could not have been extirpated from the entire northern Gulf of Mexico except by a wide-spread and extremely effective agent. Three logical suspects would seem to be disease,



poisoning, or withdrawal of the population. Nesting failure alone could hardly account for such a rapid disappearance of all age classes of the species. Concentrated effort should be given to research to learn the role of poisoning, disease, and movement in the population dynamics of the species.

A great many brown pelicans have been banded with conventional leg bands, but this has not provided much insight into the biology of the species. Emphasis should be placed on finding the best tools to obtain specific information, instead of routine mass banding of nestlings. The potential of color-marking devices should be explored and schemes developed which will enable information on population movement and dynamics to be obtained from free-living birds.

Our review of the literature reveals a serious shortage of recent information on the population status of the species throughout its range. A world-wide survey of its status would place the recent extirpation in Louisiana and its current status in Florida in clearer perspective.

The literature also reveals a dearth of scientific knowledge about the life history of the species. A considerable portion of current published information on the brown pelican may be reliable, but much of it is not presented in a convincing way.

#### SUMMARY

The recent extirpation of the brown pelican from the northern Gulf of Mexico suggested the need for a population study of the species in Florida. Preliminary aerial surveys in 1966 and 1967 led to a thorough counting of pelican nests in early May 1968. Twenty-four active colonies containing approximately 6,705 nests were counted. All were on small islands. Less than one-third of these were on the Atlantic coast. There is evidence of colony location shifts from year to year, especially in the Gulf. The lesser number of colonies, larger average number of nests per colony, and less frequent colony location shifts on the Atlantic side of Florida suggest a possible shortage of suitable nesting habitat there as compared to the Gulf coast.

More research is needed on population dynamics with particular attention to the agents in the environment which are capable of rapid mass destruction or extirpation.

## ACKNOWLEDGEMENTS

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*Florida Game and Fresh Water Fish Commission, Wildlife Research Projects Office, Gainesville, Florida 32601.*

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